

39. The method of claim 38, wherein, otherwise, said gesture identification module determines if motions of said first and second contact points are aligned or opposed.

40. The method of claim 39, wherein if said contact points exhibit opposed motion, said gesture identification module enters a zooming state; wherein if said contact points exhibit aligned motion, said gesture identification module enters a panning state; wherein aligned motion results in two contacts being treated as one in that behavior of said second contact is ignored in said panning state.

41. The method of claim 20, wherein contact motion is classified as aligned or opposed; wherein before a distinction between opposed motion and aligned motion can be determined, motion of two contacts must be present; wherein said motions are considered aligned if an angle between two motion vectors is less than a predetermined angular threshold.

42. The method of claim 40, wherein in a zooming state, said gesture identification module identifies a zooming gesture and issues a zoom command to said display control module that, when executed by said display control module, alters magnification of displayed imagery; wherein with each update of contact information, magnification of a screen is scaled by a scale factor.

43. The method of claim 42, wherein if either a first or second contact is terminated, said gesture identification module enters a was tracking two state.

44. The method of claim 43, wherein if either or both of said first and second contact continue to move, said gesture identification module remains in a zooming state to identify another zooming gesture and issue another zoom command to said display control module; wherein zooming thus continues until said first contact is terminated.

45. The method of claim 44, wherein in said was tracking two state, said gesture identification module identifies no gesture and issues no display command to said display control module; wherein said gesture identification module awaits termination of a remaining contact; wherein upon termination of said remaining contact, said gesture identification module returns to an idle state.

46. An apparatus for identifying user gestures, comprising:

- a touch sensor for determining contact information that describes locations at which a user contacts a touch sensitive surface corresponding to a display;

- a gesture identification module for receiving said contact information from said touch sensor; and

- a display control module for receiving an associated display command from said gesture identification module, said gesture identification module using state information to identify a user gesture and, responsive thereto, issuing said associated display command to said display control module;

wherein said display control module updates said display based on display commands received from said gesture identification module.

47. The apparatus of claim 46, wherein said touch sensor is physically coincident with said display.

48. The apparatus of claim 46, wherein said touch sensor and said display are physically separate.

49. The apparatus of claim 46, said touch sensor comprising:

- means for determining contact information using a set of infrared emitters and receivers arrayed around a perimeter of a projection surface, oriented such that each emitter emits light in a plane that is a predetermined distance above said projection surface, wherein a location where a user is touching said projection surface is determined by considering which emitters are and are not occluded as viewed from each of said receivers.

50. The apparatus of claim 46, said touch sensor comprising a substantially continuous set of emitters around a perimeter and three receivers, each positioned in a corner of a projection surface.

51. The apparatus of claim 46, said touch sensor comprising a resistive touch pad placed beneath a flexible display surface, said resistive touch pad comprising at least two layers of plastic that are separated by a compressible insulator, with a voltage differential maintained across said separated layers; wherein when an upper layer is touched with sufficient pressure, it is deflected until it contacts a lower layer, changing a resistive characteristics of an upper to lower layer current pathway; wherein from said changes in resistive characteristics a location of contact is determined.

52. The apparatus of claim 46, said touch sensor comprising a capacitive touch pad.

53. The apparatus of claim 46, said touch sensor providing contact information for up to two contacts; and said gesture identification module identifying gestures based on initiation, termination, position, and motion of up to two contacts.

54. The apparatus of claim 46, said touch sensors providing information for more than two contacts, said gesture identification module ignoring additional contacts initiated when two current contacts are presently reported by said touch sensor.

55. The apparatus of claim 46, said touch sensor explicitly indicating within contact information that a contact has been initiated or terminated.

56. The apparatus of claim 46, said gesture identification module inferring an initiation or termination of a contact from inception, continuation, and ceasing of position information for a particular contact.

57. The apparatus of claim 46, further comprising:

- means for comparing a position for each contact point over two or more updates to detect motion.

58. The apparatus of claim 46, further comprising:

- means for computing a difference between at least two consecutive updates.

59. The apparatus of claim 46, further comprising:

- means for computing a motion threshold below which motion is not detected.

60. The apparatus of claim 46, wherein said gesture identification module operates as a series of transitions between a set of possible states; wherein upon receipt of updated contact information from said touch sensor, said gesture identification module determines, based on initiation, termination, and motion of said contacts, whether it transitions into another state or remains in a current state; wherein depending on a current state, said gesture identification module also identifies a user gesture and sends an appropriate display command to said display control module.